

THE CHEMIST

February, 1956

VOLUME XXXIII



NUMBER 2



Dr. Mary L. Willard, F.A.I.C.

Receives Pennsylvania AIC Chapter Honor Scroll

(See Page 43)

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Program for the 1956 Annual Meeting

Presentation of Honorary AIC Membership to Dr. Harry B. McClure, F.A.I.C.

AIC ANNUAL MEETING BOSTON, MASS., MAY 10-11, 1956

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TO COME IN MARCH

The complete program for the 1956 AIC Annual Meeting, to be held in Boston, Mass., May 10-11, will be published. This meeting has the happy theme, "The Chemist Looks at Communication," and a panel of experts to develop it. By all means, plan now to visit Boston this Spring! (See page 66 for a brief outline of events at this Annual Meeting.) • A splendid paper on "The Research Chemist in the Pharmaceutical and Medicinal Chemical Industries," by Dr. Randolph T. Major, F.A.I.C., (Merck & Co.), has been revised to date by the author and will be featured in March. • For human interest, there will be the presentation of Honorary AIC Membership to Dr. Harry B. McClure. • Dr. Raymond Szymanowitz, F.A.I.C., will contribute an anniversary story about Edward G. Acheson.

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KEEPING UP WITH JET AIRPLANES?



Some of the same type of engineering development work, which produced jet airplanes and such sensational progress in the aviation industry, has been done on various types of stationary jets. While results are not as spectacular, improvements have been even greater percentage-wise in some smaller industries.

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ample. In some cases, a unit the approximate size of a man's arm can take the place of an absorption tower 3 feet in diameter and 10 or 12 feet high, with tremendous savings in first cost and no increase in operating cost. The absorber can literally supersaturate a liquid with a gas by discharging at a higher pressure than desired. Equilibrium is then established by reducing the pressure and liberating some gas, leaving a completely saturated solution at any desired pressure within certain ranges.

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EDITORIAL

The Timidity Factor

Dr. Donald B. Keyes, F.A.I.C.

Chairman of the Board, The American Institute of Chemists, Inc.

MANY years ago an internationally famous professor of chemical engineering told his class how civil engineers designed a bridge. He said the chief engineer hired sixty bright young men to make the calculations. They were required to carry out all calculations to six significant figures. They worked diligently for six months. In the end the chief engineer multiplied all their figures by six. Obviously it was this "six" which held up the bridge.

Needless to say I became interested in new bridges from then on. Soon after I was horrified to learn that a new bridge had collapsed *under its own weight*. Apparently the "six" was too large a figure in this particular case. Since then I have looked with a jaundiced eye at all safety or "timidity" factors; so have all chemical engineers that I know.

What assumption does the chemical engineer use? He must use at least one and the fact is he uses many. Unlike the civil engineer mentioned above, his calculations are not carried out to six "significant" figures, because he realizes in most cases *his* figures beyond the first two have no significance. Furthermore, he can not afford either the time or the

money to hire sixty bright young men to work for six months on *his* design problem.

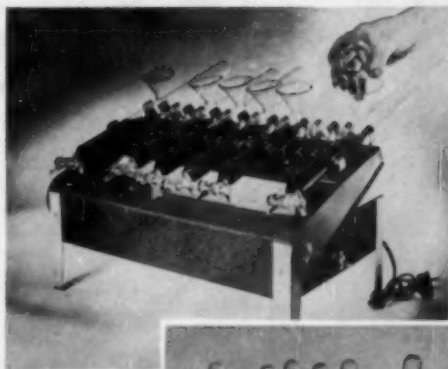
He and his colleagues roughly determine the best and worst possible conditions which might occur in the operation. This means *two* calculations. The final design is a figure lying between these two results. How close it is to one or the other depends upon many factors that never appear in the calculations.

The designer must have knowledge, experience, and sometimes intuition. Is it any wonder that competent chemical engineers are in great demand—the men who never heard of the "Timidity" Factor!

Appointed: Dr. Harold M. Sonnichsen, F.A.I.C., as vice president of Permacel Tape Corporation, New Brunswick, N. J. He joined Permacel Tape in 1944, and was recently director of the Technical Division.

New Position: Dr. Daniel Frishman, F.A.I.C., who is now director of research and development, Malden Mills, 46 Chase St., Lawrence, Mass. He was previously with Harris Research Laboratories, Washington, D. C.

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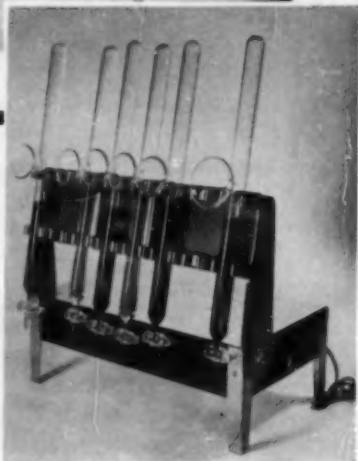


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Women In Chemistry

Dr. Mary L. Willard, F.A.I.C.

*Professor of Chemistry, The Pennsylvania State University,
University Park, Pa.*

(Acceptance address when the author received the Honor Scroll of the Pennsylvania AIC Chapter, Dec. 1, 1955, at Penn Sherwood Hotel, Philadelphia, Pa.)

THROUGH some thirty-five years of university teaching, it has been possible to attend or participate in various symposia such as those held under the auspices of American Association of University Women, or various women's honorary and professional societies, such as Iota Sigma Pi, or women's colleges, or divisional meetings of the American Chemical Society, where university teachers, industrial personnel and executives get together to discuss the so-called unsolvable problem of what to do with the woman in chemistry. It has been my good fortune to have been a faculty advisor to many women students in the College of Chemistry and Physics at the Pennsylvania State University. Together with teaching, this advising of women in chemistry in a large co-educational university has been a most interesting and challenging affair.

Many times the chronological range of advising extends from the high school senior choosing chemistry as a major, the university student choosing elective courses, the graduating seniors choosing a position, and, in later years, the graduate choosing

employees from his alma mater. From my close association with women chemists, as students, as successful chemists in industry, it is my opinion that there is always a place for a keen, hardworking woman chemist with a deep liking for chemistry and a friendly attitude toward mankind.

There are a great number of homilies recorded in regard to women in chemistry, such as "chemistry is regarded as a man's field." In prehistoric times and in the early civilization, man was the hunter, woman was the housekeeper. Yet women might be said to have made the first chemicals, since salt, potash, and soap were the early commodities used by the housekeeper. Some have said that in the background of every good woman chemist is a man; father, husband, or employer, aiding and sponsoring her work — and sometimes even taking the rewards of work. Yet, are there not three women behind every man chemist; his wife who tries to get him to the laboratory properly fed and clothed and in an amiable frame of mind at a reasonable hour in the morning; his secre-

tary, who is the one who can translate his hieroglyphics and edit his scientific papers so that they will be acceptable to the journals; and then his laboratory assistant, the girl who washes his glassware and cleans up after the great experiment, who sympathizes with him on those that don't come out right and rejoices with him on those that do. Where would our great laboratories be without team work, whether men or women?

The First Women Chemists

Women chemists first appeared in the early 19th century, usually associated with their husbands and often in fields knowledgeable to women. They were women of strong personality and high mental attainments.

Madame Lavoisier, the wife of the great Lavoisier, was an able, intelligent woman who not only knew something about the theory of combustion but studied Latin and English so as to be a translator for her husband. She translated Lavoisier's *Memoirs of Cavendish*, also of Henry and of Priestly into English. She was an artist and made the drawings for her husband's books. After her husband's death, she held salons not only entertaining many eminent scientists, but winning them over to the new theory of combustion suggested by her husband. She finally edited and had printed her husband's memoirs giving the results of his investigations in a truly scientific way.

Mrs. Jane Haldimand Marcet, the wife of a London physician, wrote

and published anonymously, a book called "Conversations on Chemistry." This book was written as a series of questions and answers of a teacher, Mrs. Bryant and her two scholars, Caroline, the curious and unbelieving pupil, and Emily, the reasoning and diligent pupil.

In the preface of the book she states, "In venturing to offer to the public . . . an Introduction to Chemistry, the author . . . a woman, conceives that some explanation may be required; and she feels it the more necessary to apologize for the present undertaking as her knowledge of the subject is but recent, and she can have no real claim to the title of chemist." Refreshing, natural and unaffected in her teaching, she was immediately aware of "new essential improvements and discoveries in chemical philosophy" and was continually in correspondence with her contemporaries—Sir Humphry Davy, Mr. Faraday and others.

Mrs. Almira Hart Lincoln Phelps, twice married, of New England ancestry, was one of the earliest women teachers of chemistry. She taught in Connecticut and at the New York Female Academy, Troy, N. Y., but her longest period of teaching was at Rennselear Institute at Troy, N. Y. Amos Eaton, who at that time was in charge of chemistry at Rennselear, was said not only to tolerate women but to encourage them to study chemistry. Aside from teaching, Mrs. Phelps' principal contributions to

chemistry were a French dictionary, *A Chemistry for Beginners*, and *Familiar Lectures on Chemistry*. Mr. Phelps was interested in geology and in the American Association for the Advancement of Science, and Mrs. Phelps was the second woman elected to this organization. She carried on an extensive correspondence with Robert Hare. Mr. Dalton and Dr. John K. Mitchell. In discussing the applications of chemistry she says:

"This science bears an important relation to housekeeping—in the making of gravies, soups, jellies and preserves, bread, butter and cheese, in the washing of clothes, making of soap and economy of heat in cooking. To females, then, some knowledge of chemistry must be very desirable."

The Polish woman, Madame Curie, about whom one ought to say the most, is known and revered by layman and scientist alike. She worked with her husband, Pierre Curie, until his early death. She twice received the Nobel Prize, first for the discovery and then for the isolation of radium. This was the ideal husband-wife team working in a scientific field.

Mrs. Ellen H. Richards, the dis-taff member of another husband-wife chemical team, was a sanitary chemist of merit although usually thought of in relation to her work in home economics. She started out, under her husband's direction, to do investigational work on the samarium and gadolinium content of minerals; she soon determined to direct her efforts toward educating the public

in regard to pure air, pure water, and pure food.

Women Chemists Today

World War II opened almost all technical fields to women, even including explosives and rubber. In the beginning of the 20th century, women worked as individuals or pioneers in technical laboratories, often in government laboratories. With flowing skirts and high-collared waists, they were looked upon as individualistic women who were a little different although really they were the vanguard of women in many of our present day laboratories. They worked best alone. In the 1940's, it was necessary for the woman chemist to fit in with a group in the laboratory, to adjust herself pleasantly in the group, carry her share of the work, and she did it, and industry wanted more of her even after the war stopped.

As more and more women go into chemistry and allied fields, more and more importance is attached to their work. From the National Science Register, the American Chemical Society membership lists, and the Department of Labor reports, it would seem that one out of every ten chemists in 1955 is a woman, in contrast to one out of every forty chemists in 1940 and one of five-hundred chemists in 1930. This would indicate that in all sectors of the chemical industry, the percentage of women employed in technical capacities is exceptionally good.

This may be due to several facts—there is definitely an increased interest among high school boys and girls in scientific fields; the newspapers; the popular scientific magazines such as *Popular Science*, *Popular Mechanics* and perhaps *Photography*; and certain technical or semi-technical television programs (such as those produced by Johns Hopkins University) have considerable effect on developing interest in science among the high school students. Extra-curricular high school activities, such as the Camera Club, the Science Club, seem to interest students in science.

One of the greatest impetuses to high school girls entering scientific fields are the competitive fellowships or scholarships furnished by certain industrial concerns, such as Westinghouse Electric Corp., to encourage university study in science or specifically in chemistry.

The fact that there are a few top echelon women chemists receiving top salaries indicates that there is plenty of room at the top for good women chemists. The high level of scholastic and professional ability of our graduate women chemists who will later become key women in industry indicates that women chemists are on the move.

Training for Careers

In regard to the training of women at B.S. level who want to make a career out of chemistry, there are four musts:

It is almost impossible for a woman chemist to find a position or be of any use to anybody unless she has a sound training in the fundamentals of chemistry, inorganic, organic, physical, analytical, and perhaps biochemistry, such as her brother has. She must have had the courses and received good grades.

A woman chemist, if she has not already been exposed to such, should certainly learn how to spell and do simple arithmetic at least as an extra-curricular activity. Also a woman chemist should be able to read and write the English language and perhaps be able to speak it clearly.

It is desirable for the woman chemist to have some special training in fields in which women are more likely to be competent, such as food, textile, or medicinal chemistry, rather than refinery, steel mill or foundry chemistry.

Further, academic training or senior research for the prospective woman chemist at the university might take advantage of certain well-known feminine characteristics, such as delicacy in handling small objects or apparatus in microanalysis or the preparation of replicas in electron microscopy; such as patience in control experiments, where the same thing is repeated over and over.

Advancement

In the advancement of women in chemistry after the university, there have been a number of snags in the

WOMEN IN CHEMISTRY

past, some of which have been ironed out and some of which still exist. One of the first difficulties which the prewar woman chemist had was seeking employment, particularly in the depression times of the early thirties. In examining places where women are generally accepted in technical fields, one finds them in fields with which women have been associated for centuries. The proportional placement in chemical industry varies considerably from heavy quotas employed in drugs, medical, food and textile companies to relatively few engaged in the manufacture of crucible steel, fertilizers, or heavy chemicals. I don't think that the entrance of the woman chemist into the steel mill or the oil refinery *per se* is going to help to raise the status of women in scientific work, but I do think that a woman chemist ought to have enough creative ability, stamina and just ordinary push to advance scientifically into other fields than those associated with women in her great grandmother's time. What is the matter with us girls? Do we lack the old Yankee "Git up and git"? Since World War II, a renaissance is certainly taking place in areas of chemical work opening for women, even in some cases managerial positions in the smaller firms are now open to women, but there is still opportunity for more.

Many women's organizations, women's clubs, service clubs, business and professional women's clubs have

struggled with the problem of equal pay for equal work. There will never be a way to raise the status of women in industry until they can and deserve to have equal pay for equal work. Man is still the bread winner. When women's salaries are projected against the salary of men of comparable age and educational background, the gap in earning power widens and is particularly noticeable in the low income brackets, but not so noticeable in the higher income brackets.

Since 1950, the percentile concentration of all women chemists is heaviest in the younger age groups where the Department of Labor says one out of every six chemists is of the feminine gender; this is not true in *American Men of Science*, the Sigma Xi register, *Chemical Who's Who*, since the percentile concentration of women chemists reporting is at least 25 years older, the 45-55 age group. Considering the younger group of all women chemists, there is an interesting psychological problem. Most industries have a so-called breaking in or training period for all new technical employees where they may go to classes for six or more months, or may go to different departments to work during a year or so to learn the complete process or even to various plants over the country for one to five or more year periods. Here a woman does not seem to be able to compete with a man. She is not as quick, pliable, or

willing to change plans pleasantly, and with twenty-four hours or less notice. She becomes so interested in detail that she is seldom channeled out of her original laboratory niche, which means that she does not take advantage of the opportunity to compete for more lucrative sales or administrative positions as the man chemist. Unfortunately, in the past, she was not competitive, was timid, lacked aggressiveness and push, and unless she was exceedingly capable and foresighted and did outstanding work, was entirely out of the picture in five years. Fortunately, more recently, women chemists have been able to join groups or teams working on long-time projects in industry. They also are losing lack of aggressiveness, nervous tension, and the inability to work with others.

Opportunities

Many large industrial companies state that the chief problem in hiring women chemists is matrimony or uncertainty of tenure and investment of unreturnable funds in training women who will not be with them for an extended period of time. An employer is usually not so concerned with regard to an inter-plant or intra-urban marriage and will go along with a wedding present, a short honeymoon and maternity leave and expenses for a good woman chemist who will continue working. Chiefly, what an employer wants his employed woman chemist to do is to

make his interests and problems precede her interests and problems, matrimonial or otherwise. He wants her to be working on his problems rather than showing the size of her diamond ring to the entire laboratory or reading the list of groceries to be purchased that day to her husband and tying up a telephone on unessential business. Since the war, the married, middle-aged women chemists, whose family responsibilities have diminished, have been one of the valuable but little tapped reservoirs of woman power in the chemical field. Such people have been used in the teaching and editing field quite successfully. Chemically trained wives of graduate students have been helpful in the universities as secretaries, clinical and laboratory assistants and assistants in scientific libraries.

New opportunities for women in chemistry are presenting themselves every day. However, I contend still that women are most successful in places where they can use their natural knowledge, traits, characteristics, and abilities. Women chemists are beginning to realize this and it is certainly lending stature to their status. Women naturally know something about food, clothing and shelter, perhaps a little about drugs and medicine, through home nursing. Women are naturally patient and will do the same thing over and over again and enjoy doing so. Women are more delicate in handling things than men, and their smaller hands are

WOMEN IN CHEMISTRY

more capable of doing microwork, for example. Women often have more sensitive senses, say of taste, odor, or color, although this may be debatable.

Women chemists have long been associated in considerable number in the field of biochemistry. Since food, nutrition and body processes are related in biochemistry, women chemists are making use of natural knowledge and abilities. More women chemists are becoming interested in what atomic radiation will do to food, nutrition and physical well-being. Closely related to the biochemical field is that of clinical technician, or a chemist who assists physicians in special chemical problems, perhaps on the staff of a hospital.

The spot in industry where women chemists are found in the largest number is probably in the analytical laboratory as control chemists or in the research laboratory as assistants to researchers. The control chemist has some definite responsibilities but there are also disadvantages for a woman chemist such as shift work and sometimes samples must be got from various parts of the plant at various hours of the night. Work of this kind can be very stimulating to a woman chemist in the fields of textiles and foods, if she learns the reasons why things are done and becomes a member of a team working on the development and success of the tests, she makes a better analyst. The cosmetic field and the merchandising

field open new vistas to the woman chemist.

Teaching is not comparatively too remunerative but it is a pleasant life and has been a woman's field for many years. University teaching in chemistry is a field in which highly trained women have participated on almost equal grounds with men. High school teaching of chemistry has many advantages for women chemists. Women high school teachers of chemistry are still much in the minority. Library work and librarians are in continual demand. It is desirable for a woman chemist to have some library training. A chemical secretary, secretary to a director of the laboratory, personnel work and executive work are all openings for the woman chemist. Sales is a highly competitive field but said to be a highly remunerative one and there are good opportunities for women to sell drugs, textiles, furs, and food.

A non-laboratory woman chemist may be a patent attorney connected with a large industrial laboratory. We need more chemical Portias. There is a broad field for women in the editing area. Many journals and technical publications now have assistant and associate editors that are women. Abstractors, calculators and ghost writers of technical reports are fields where women's talents can be used. A woman chemist with a large assortment of languages on the end of her tongue, and who is able to read and translate Russian, Japanese or

Dutch on sight is a pearl beyond price. Women chemists as translators of technical papers, who have an innate ability with foreign languages, are certainly few and there are opportunities in this area for young women going into chemistry.

Finally, quoting Dr. Mildred Thompson, former dean of Vassar

College, "For centuries, woman was only a sex, as persons and chemists women are still young." With a dawn of a new era for women in chemistry, since World War II, we believe that there is always a place for a keen, hardworking chemist with a deep liking for chemistry and a friendly attitude toward mankind.

Dr. Mary L. Willard

Dr. C. Maresh

*Manager, Research Service Section, Research Div., American Cyanamid Co.,
Bound Brook, N. J.*

(Presented when Dr. Willard received the Honor Scroll of the Pennsylvania AIC Chapter.)

MARY Louisa Willard was born in State College, Pennsylvania, May 19, 1898, and has resided there to this day. She has grown with Penn State from the time it was just another small college in the heart of the state of Pennsylvania to the present when it has finally attained the status of a university, second to none in the nation. Mary Willard was the daughter of a mathematics professor, who passed away early in her life and this resulted in a very close relationship with her mother which has continued to this day. She became dedicated to the service of her fellow man, who in her sphere of influence was the student in general and more specifically the student in her class.

Mary Willard attended Pennsylvania State College from 1917 to

1923, having received the B. S. degree in 1921 and the M. S. degree in 1923. The characteristic in her personality which was to be so evident later in life and recognized by her fellow chemists was evident even then.

Recently I met a fellow Penn Stater whose recollections of his undergraduate days were rather vague but whose recollection of Mary Willard was crystal clear, as the laboratory assistant in his freshman laboratory class who was so eager to help him and others during those formative years of their lives. After these many years, he had remembered the trait in which she had excelled.

From 1923 to 1927, she attended Cornell University where she was influenced by the teaching of Prof.



*Dr. Willard Receives Honor Scroll from
Hillary Robinette, Chairman, Pennsylvania AIC Chapter*

Chamot and others to devote her life to the field of microscopy and related subjects. Her genuine interest in people, and feeling for her fellow man are exemplified by deeds which she performed such as the presentation of a basket of fruit to two fellow classmates as they were embarking in New York City for post doctoral study—one in Munich and the other in Vienna. Dr. Willard may have forgotten, but Ralph Cornwell and Harold Lacey remember that token very vividly to this day.

Dr. Willard carried on post doctoral study at various times at the University of Pittsburgh, Johns Hopkins and New York University.

She returned to the Pennsylvania State College in 1927 to establish a course in chemical microscopy. Since 1927, over one-thousand students have taken her course in chemical microscopy and many of these have followed her in advanced courses in alkaloid microscopy, textile microscopy, crystallography, photomicrography and micro techniques. She

was assistant professor of chemistry from 1927 to 1938; associate professor in chemistry from 1938 to 1948 and professor of chemistry from 1948 on. Those of us who had worked with her owe a great deal to her as a teacher but even more for the interest and enthusiasm that she was able to instill in us for our chosen fields of endeavor, not only at the time we were under her direct influence but later in life as well.

Dr. Willard is presently, and has been for some time, advisor and scheduling officer to all women in chemistry, chemical engineering, physics, premedical and science at the Pennsylvania State University. Her wise counsel and aid has by no means been limited to women or to her own students. Many are aware of the human side of Mary Willard. Her contacts at State College and elsewhere have been fostered primarily for the benefit of her students. I can speak from personal experience when I say that she always knew of a job or cheap lodgings for the student in financial difficulty.

Dr. Willard is a member or fellow of many societies. In 1942, she was local president of Sigma Xi; local secretary in 1942 and local president in 1944 of Phi Kappa Phi; national representative to AAAS from 1946 to 1954; local president and national vice president, 1930, of Iota Sigma Pi (Honorary Women Chemists); local president 1937-1942, national president 1945-46, member executive

board, 1947-52, of Sigma Delta Epsilon (Honorary Women in Science); Pennsylvania president, 1943-44, and member national board 1948, of Delta Kappa Gamma (Women Educators).

She is a member of the American Association of University Professors, American Chemical Society since 1920, secretary and chairman of the Analytical and Micro Division in 1947, member of the Nomenclature Committee and Committee on Divisional Activities, Division of Chemical Education, Division of History of Chemistry. She is a Fellow of THE AMERICAN INSTITUTE OF CHEMISTS as well as of the American Association for the Advancement of Science. She is a member of the Council of the AAAS, of the Pennsylvania, New York, and Maryland Academies of Science, the American Crystallographic Society, the editorial board of *Microchemica Acta*, the Forensic Society, the American Microscopic Society, the Austrian Microchemical Society, the Analytical Section of the French Chemical Society and the Metropolitan Pittsburgh's Analysts.

Her research and publications are adequately covered in *American Men of Science*.

Dr. Willard's training and character have particularly suited her to another service of mankind which she has undertaken, namely the development of the science of criminalistics. As most of us know, this is not

a very remunerative one. Her sacrifices in advancing the frontiers of this science in the nation and particularly in the state of Pennsylvania again testifies to the unselfish attitude she takes to the service of her fellow man. This characteristic plus her deep interest in people, her faithfulness to her students have endeared her in the hearts of all of us.

It is a pleasure, therefore, that I, representing her many students, the Pennsylvania State University, the many organizations that she has served faithfully, compliment her and join in approval of the choice of Dr. Mary Louisa Willard made by the Pennsylvania AIC Chapter for the award of its 1955 Scroll of Honor.

Presentation to Dr. Willard

DR. Mary L. Willard, F.A.I.C., professor of chemistry at The Pennsylvania State University, University Park, Pa., received the 1955 Honor Scroll of the Pennsylvania Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, INC., at its meeting held in the Penn Sherwood Hotel, Philadelphia, on December 1, 1955.

Hillary Robinette, Jr., chairman of the Chapter presided. John H. Nair, AIC president-elect, represented the officers of the national organization. Dr. Charles Maresh, manager, Research Service Section, Research Division of American Cyanamid Company, a former student of Dr. Willard, spoke on her professional career. After receiving the Honor Scroll from Mr. Robinette, Dr. Willard responded with an address on "Women in Chemistry." (See preceding pages.)

The citation on the Honor Scroll to her reads:

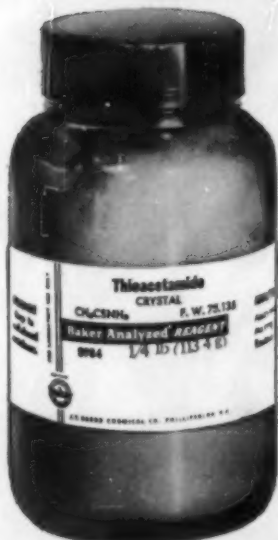
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(for)

Her outstanding efforts in advancing the professional woman chemist; her attainments as a chemist, and the inspiration she has given as a teacher.

Starting Salaries: According to Dr. J. Bennett Hill, director of research and development for Sun Oil Company, Philadelphia 3, Pa., the average industrial company now may be expected to pay a starting wage of \$350 per month for holders of B.S. degrees to \$550 for Ph.D.'s. "Prospects for advancements within a company for scientifically-trained young people are excellent. There is a growing tendency in industry, as processes become more and more complex, to draw upon men with technical backgrounds for top management posts."

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An Outline for Creative Thinking

Dr. Maurice J. Kelley, F.A.I.C.

Director, Organic Research Laboratory, Nopco Chemical Co., Harrison, N. J.

I. Background

There is only one researcher in every 1000 of the U.S. population; yet researchers are concentrated in certain areas, such as educational centers and large industrial laboratories. Researchers are actuated by the same general motives that apply to all people; a desire for: Power, fame, wealth, esteem of colleagues, helping mankind. The last two motives are more likely to be important among researchers than among the population as a whole.

On the other hand, the basic training of the researcher causes some special distinguishing attitudes, inclinations, and outlook.

Inclinations

Curiosity
Logical approach
The repetitive experiment
Solve difficult problems
Introversion
Self Improvement

Outlook

Freedom
Individualism
Skepticism
Optimism
Speculation

Some more specific qualities which are essential, or at least highly desirable, in the researcher are:

(1) *Cooperation.* The ability to work harmoniously, yet effectively, with people.

(2) *Accurate observation.* This enables the researcher to see truly every detail without prejudice; to be patient in getting all the data and in organizing it. He is tolerant of unexpected or undesired results. He is careful to record observational data as it really is and at once; for he realizes that, if one delays, one is most

likely to write what he remembers, and one is likely to remember what he wants to remember. He is neat in his work, and articulate in his communications. Physical orderliness stems from an orderly mind.

(3) *Judgment.* A sense of balance which controls enthusiasm and imagination, and which directs all efforts into useful and practical channels. Judgment is the capacity to think under pressure, to analyze to pick out essentials, to appreciate their significance, to make right decisions.

(4) *Aggressiveness.* This is largely a native characteristic, and is a combination of ambition, initiative, drive, energy and perseverance. It is not mere action, for action without direction is merely a faster form of drifting. Aggressiveness is the will to attack a problem with resourcefulness, to learn, to overcome obstacles, to push to a successful conclusion.

Some writers have said there are two kinds of people: Those who get things done, and those who spend the same amount of time explaining why things cannot or should not be done.

(5) *Creative thinking.* (This will be elaborated on in Part II). A few comments on optimism. This quality is so necessary to offset the tendency towards discouragement which is natural in research, where 90 per cent of the results are disappointing. Optimism is the frame of mind which expects success. Optimism is a prerequisite for serendipity—it predisposes one to expect positive results and to recognize them easily, even if those results are different from those anticipated. Optimism is a characteristic of youth.

"Youth is not a time of life; it is a state of mind, a temper of the will, a quality of the imagination, a vigor of the emotions; a predominance of courage over timidity, of an appetite for adventure over a love of ease.

"Nobody grows old merely by living a number of years; people grow old by deserting their ideals. Years wrinkle the skin; but to give up enthusiasm wrinkles the soul."

—Gen. Douglas MacArthur

II. Creative Thinking

Creativeness is the ability to produce something new and different. Creative action requires creative thinking, and these abilities are not possessed equally by all. It has been estimated that 10 per cent of the researchers contribute 90 per cent of the creativity. Nevertheless, all researchers must possess some degree of creativity, and a successful laboratory must have some highly creative people. Historically speaking, we have passed through an era of random creativeness into an era of deliberate creativeness. In recent years, the subject of creative thinking itself has begun to be studied. Maurice Nelles, director of research for Borg-Warner, has stated that one of the really big developments of the next fifty years may well be a major increase in the rate of learning.

Creative thinking applies equally to all sciences and to all problems. It can be developed, and it can also be stifled or destroyed. Creative thinking can be developed by intensive personal effort and, believe it or not, by practice. This development is encouraged by the right climate: Management attitude, inspiring leadership, creative colleagues, challenging work. Poor climate and excessive red tape hinder creativity. The really

successful research director does not dominate the whole research program; he creates the atmosphere and environment which calls forth the best in the researchers. He inspires, stimulates and motivates.

Formal education subjects our learning to criticism, and teaches us to judge and criticize. It is essential that the researcher clearly distinguish *problem judging* from *problem solving* (creativity). The latter is quite individualized and unique; in the former everyone would, starting with the same facts, arrive by the same logical process at the same answer. Analysis and judgment, in themselves, are not creative; they must be momentarily set aside to allow our creative talents full sway.

To encourage one's own creative thinking:

- (a) Fear not to be illogical.
- (b) Overcome inertia towards change, towards the unconventional.
- (c) Realize that insight does not flow from a plan or a logical sequence.
- (d) Remove all mental blocks and personal inhibitions; let imagination roam.
- (e) It helps to have 'crazy' ideas; these should be encouraged, not ridiculed.
- (f) "All truly great ideas seem absurd when first proposed."

—Whitehead (great American psychologist and educator.)

The creative thinking process consists of seven stages, the heart of which is insight, or intuition. Insight occurs in a flash, and we know unmistakably that the answer is clearly before us. The other stages usually,

but not always, occur though the extent of each in time may vary widely from a few seconds to even years. To improve one's powers of creative thinking, it is helpful to understand the pattern or stages of the process.

Stages in Creative Thinking Process

(1) *Problem (Definition)*: The problem may be apparent to many people, or may be recognized only by one. The problem must be clearly understood and defined.

We must ask ourselves time and time again what really is the problem, what are the actual boundaries, what are the only essential rules that must be followed. If we impose a limitation that is not really a part of the problem, we make more difficult or even impossible the solution of the problem.

(2) *Preparation*: Saturate one's mind with all existing knowledge on the problem. Rearrange the ideas, imagine further data, mentally construct possible solutions. Completely immerse one's self in the problem.

A photographic memory is a distinct asset in calling up the multitude of facts, and every invention is a new arrangement of facts.

"Bull sessions" help; so does the right type of conference, wherein the avowed purpose is to generate ideas. Unconventional thinking is encouraged and criticism of any idea, no

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matter how foolish, is forbidden during the conference. All ideas are recorded, for judicial study the next day (gives the subconscious mind an opportunity to go over the ideas). Perhaps the right answer is not among them, but their expression may lead to insight on the part of one of the conferees.

(3) When no solution readily emerges from either the logical approaches or the wild imaginings, then *frustration* sets in. This is a good sign; it nearly always precedes insight.

(4) *Incubation (Diversion)*: Set the problem aside; allow our subconscious minds to go to work. Work on something else, relax by means of

recreation, get a good night's sleep. It is amazing how often insight occurs on awakening, after a previous day's intensive preparation (and frustration).

(5) *Insight* (Illumination): In a flash (of genius, perhaps, to use the U. S. Patent Office phraseology), the answer comes before us, and we know it is right. Sometimes a whole series of insights are necessary to the final creative product.

(6) *Verification*: The solution just conceived is put to the test, practical details are worked out, and the idea may be extended or elaborated on.

(7) *Communications*: This is the necessary step to secure action upon the new discovery, to enable it to produce benefits. The researcher must sell: himself, his ideas, his results.

It helps creative thinking to reject the complex in favor of the simple, to consider the opposite of the conventional, and to really dig into what has been dismissed as being too obvious. It is so easy to overlook the obvious. Creative thinking is primarily individual, introverted; yet exposure of others to a highly creative person stimulates all to more creativity. A proper amount of pressure is essential for maximum creativeness, yet too much or especially needless pressure is detrimental. Creative thinking requires 100 percent involvement of the whole person, intensive

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- "The Creative Mentality and Research Problems" Dr. David B. Hertz (Columbia University). Chapter 2; pp. 28-44 from "Selection, Training and Use of Personnel in Industrial Research," King's Crown Press. New York (1952)
- "The Qualities of the Good Research Man." Dr. Maurice J. Kelley (Nopco Chemical Co.) *The Chemist* 26, 161, 1949

The Chemist and Management

(A summary of the address given by Dr. Clifford F. Rassweiler, F.A.I.C., vice chairman of the Board, Johns-Manville Corporation, New York, N. Y., before the Annual Meeting of THE AMERICAN INSTITUTE OF CHEMISTS, May 12, 1955, Chicago, Ill.)

THE CHEMIST must think of management as being more than a boss giving orders. Modern management is also a teacher, a tool to be used for getting his job done better, and a team which he should be striving to join.

Modern management tends to establish policies and practices about how a responsibility should be carried, rather than giving direct orders. A chemist should study these policy and practice statements as a textbook from which he can learn how to do his job more effectively.

Management is a mechanism set up to provide the policies, the decisions, the finances, and the facilities which the chemist needs to accomplish results. Management is not only an order-giving group; it is also a service organization. The chemist should study his management to see how he can use it to get the most effective climate for doing his work and the promptest and most effective utilization of the things he develops.

Modern management is not just a few men on a remote "executive floor." Management is the integration of the efforts and thinking of a large group of men. The chemist should strive to become part of this group. Often he is already "a part of the team" without really realizing it.

To accomplish these objectives, the chemist must strive to understand the differences in thinking habits between scientists, production men, salesmen, and financial people. To deal with them he must understand the pattern of thinking which motivates their decisions. The more he understands about how other people reach decisions, the more rapidly he can, himself, become a part of the management team which integrates the activities of these diverse groups into joint action.

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L. T. Work, *Past President*

December Meeting

The 306th meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS was held Dec. 14, 1955, at 6:00 p.m., at The Chemists' Club, New York 17, N. Y. President Dinsmore presided. The following officers and councilors were present: J. H. Bruun, R. P. Dinsmore, A. W. Fisher, Jr., L. A. Hall, F. A. Hessel, K. M. Herstein, D. B. Keyes, G. A. Kirton, H. W. Mackinney, J. H. Nair, E. Ott, G. L. Royer, M. Sittenfield, W. J. Sparks, L. Van Doren, and L. T. Work. V. F. Kimball was present.

Upon motion, the president was authorized to appoint a special committee to consider the objectives of the INSTITUTE and the methods by which they can best be implemented.

The Secretary's report showed a total

membership of 2823.

The Secretary announced with deep regret the deaths of the following members: Dr. Egbert Freyer, Fellow, on Nov. 13, 1955; Ivar H. Kinneberg, Member, on Oct. 17, 1955; Earl B. Putt, Fellow, on July 30, 1955; Sidney H. Roberts, Fellow, on April 20, 1955, and Dr. Henry C. Sherman, Honorary Member and Gold Medalist (1933), on October 7, 1955.

Dr. Hall presented the following resolution in memory of Mary Alexander:

Mary Loretta Alexander, Universal Oil Products Co., Des Plaines, Ill., passed to her reward on June 27, 1955.

She was born in Iowa on Feb. 17, 1917, receiving the B.A. degree from the University of Iowa and doing graduate work as a Fellow at Iowa

COUNCIL

State College. For 15 years she was assistant to the research director, (the late) Dr. Gustav Egloff, at Universal Oil Products Co. She was a specialist in literature research and technical writing in organic chemistry and petroleum chemistry.

BE IT THEREFORE RESOLVED that the Council of The American Institute of Chemists record its deep sorrow in the passing of our colleague and good friend, Mary Loretta Alexander, and

WHEREAS she was a brilliant young chemist who had won well deserved recognition in her own right for her contributions to the literature of petroleum chemistry, and

WHEREAS her fine upright character and her splendid intellectual abilities will be long remembered with affection and respect, and

WHEREAS she served as Secretary-Treasurer, Chairman of the Public Relations Committee and Councilor of the Chicago Chapter, The American Institute of Chemists, as well as made valuable contributions to the American Chemical Society and other scientific organizations, and

WHEREAS she was a staunch supporter of The American Institute of Chemists and was zealous in advancing through her work the chemical profession, as well as being a lady of the highest integrity, scholarly achievement and enthusiastic supporter of The American Institute of Chemists;

BE IT THEREFORE RESOLVED that the Council of the American Institute of Chemists at this meeting on Dec. 14, 1955, express its deep regret that Mary Loretta Alexander will no longer be with us in this world, and

BE IT FURTHER RESOLVED that a copy of this resolution be sent to her mother, Mrs. Alice Alexander, as an expression of our sympathy and that a copy remain in the permanent files of The American Institute of Chemists.

The Secretary presented a letter from the American Association for the Advancement of Science indicating that the AIC application for affiliate status would be approved, and that we are entitled to

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appoint two representatives to the AAAS council. It was decided that representatives would serve on a calendar year basis for one year, and that they would be the secretary and president-elect of the INSTITUTE, with the president empowered to appoint substitutes, if for some reason these representatives are unable to serve. The Council decided to affiliate with Section C (chemistry) of the AAAS.

An invitation from the Western Chapter to hold the 1958 Annual Meeting in Los Angeles was referred to the Annual Business Meeting.

A letter from Benjamin Sweedler, chairman of the Committee on Constitution and By-laws was presented, in which he stated that the Constitution requires that the following officers be elected in 1956: President, President-elect, Secretary, Treasurer, three Councilors-at-Large, and a fourth position as Councilor-at-Large to fill the remaining two-year term of a previous Council appointment.

The proposed Constitution of the Niagara Chapter was referred to the Committee on Constitution to see if there were any conflicts in it with the national Constitution.

Dr. Royer, chairman of the Committee on Manpower, announced that he had

appointed two additional members to his Committee: Drs. Herman S. Bloch and Robert D. Coghill.

Dr. Fisher stated that the New England Chapter planned a Spring meeting at which its Honor Scroll and Student Medals would be presented.

Dr. Bruun reported that the Niagara Chapter's meetings had been most active. Three meetings concerned scientific salaries, training for management, and high school teaching. The attendance ranged from forty to fifty at each meeting with discussion periods lasting over an hour.

Mr. Sittenfield reported on the Honor Scroll Award of the Pennsylvania Chapter to Dr. Mary L. Willard. (See this issue of THE CHEMIST.)

Dr. Hall stated that the Chicago Chapter held a meeting in November on the subject of "You and Management" which evoked a lively discussion. In January the discussion topic is Women Chemists. On February 17th, Honorary AIC Membership will be presented to Dr. Roy C. Newton, F.A.I.C.

Dr. Mackinney stated that the New Jersey Chapter had held a panel discussion in October on High School Teaching, and another on December first on "The Facts of Life for Chemists," in cooperation with the Rutgers University Chapter of ACS Affiliates. On March 26th, the Chapter plans a visit to Picatinny Arsenal, and on May 3rd, it will present its annual Honor Scroll Award.

Mr. Kirton reported that the Ohio Chapter will meet in the Spring for an all-day session. Plans are being made for the 1957 Annual Meeting in Akron.

Mr. Herstein announced that Honorary AIC Membership would be presented to Dr. Harry B. McClure on January 12th. On February 10th, the Chapter will join with the American Chemical Society to hear a panel symposium on High School Teachers, with Dr. Hubert N. Alyea acting as moderator.

President Dinsmore appointed the following committee to consider the manner of awarding student medals: John Kotrady, chairman; Richard L. Moore, and Clifford L. Ayres.

Mr. Nair, chairman of the Committee on Professional Liaison, announced that the following persons had been added to his committee: Dr. Waldersee B. Hendrey and Edward L. Gordy.

Dr. Fisher presented tentative arrangements for the AIC Annual meeting to be held May 10-11, 1956, at the Hotel Statler, Boston, Mass. He announced that Dr. Warren K. Lewis will be Honorary Chairman of the Annual Meeting.

The National Council will meet at the Hotel Statler, Boston, Mass., at dinner, Wednesday, May 9th, just preceding the Annual Meeting.

The following new members were elected:

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Allen, Dr. Milton J.

Director of Physical Research Labs., Ciba Pharmaceutical Products, Inc., 556 Morris Ave., Summit, N. J.

Amsz, Jr., Joseph

Director, Special Products Lab., Red Star Yeast & Products Co., 325 N. 27th St., Milwaukee 8, Wisc.

Armistead, Dr. William H.

Director, Res. & Dev., Corning Glass Works, P.O. Box 544, Corning, N. Y.

Armstrong, Dr. Robert T.

Technical Director, Textile Div., Celanese Corp. of America, 180 Madison Ave., N. Y., N. Y.

Arranaga, Alexander B.

Research Chemist, U.S. Naval Ordnance Test Sta., 3202 E. Foothill Blvd., Pasadena, Calif.

Atkins, Jr., Don C.

Research Supervisor, Chem-Mill Div., Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

Austin, William E.

Research & Development, hair dyes, Nestle-LeMur Co., 1041 Prospect Ave., New York, N. Y.

Carrigan, Robert E.

Chief Chemist, Union Wadding Co., 125 Goff Ave., Pawtucket, R. I.

Dalter, Raymond S.

Assistant to Associate Director, Solid State Physics Div., Res. & Dev. Labs., The Franklin Institute, 20th & The Parkway, Philadelphia 3, Penn.

Earing, Dr. Mason H.

Research Staff, Wyandotte Chemicals Corp., Wyandotte, Mich.

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Eck, Dr. J. C.

Project Leader, Allied Chemical & Dye Corp., Columbia Road, Morristown, N. J.

Edson, Dr. Frank G.

Prof. of Chemistry & Dean, William Jewell College, Liberty, Mo.

Edward, Brother J., F.S.C.

Teacher of Chemistry, Christian Bros. College, E. Parkway at Central, Memphis, Tenn.

Elmer, Dr. Otto C.

Chemist, General Tire & Rubber Co., Research Lab., Akron, Ohio.

Sellers, Jr., Henry G.

Head, Process Dev. Section, Southern Research Institute, 917 S. 20th St., Birmingham 3, Ala.

Weinberg, Jesse L.

Secretary, Food Research Laboratories, Inc., 48-14 33rd St., L.I.C. 1, N. Y.

Weltman, Clarence A.

Executive Vice President & Technical Director, Alox Corp., P.O. Box 556, Niagara Falls, N. Y.

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ASSOCIATE

Larsen, June L.

Librarian, Sugar Research Foundation, 52 Wall Street, New York 5, N. Y.

REINSTATED AS FELLOWS

Mellan, Ibert

Director of Research, Cole Labs, Inc., Retort Pharmaceutical Co., 42-25 9th St., Long Island City, N. Y.

Townley, Dr. Robert W.

Head, Research Division, Personal Products Corp., Milltown, N. J.

AIC Activities

Baltimore Chapter

Chairman, Dr. Leonard M. Rice

Vice Chairman, Dr. Norris W. Matthews

Secretary-Treasurer,

Rev. Edward S. Hauber, S.J.

Loyola College

4501 North Charles St.,

Baltimore 10, Maryland

Corresponding Secretary,

Miss Dorothy Rice

National Council Representative,

Dr. Albin H. Warth

J. Bernard Edmonds

It is with deep regret that the Baltimore Chapter announces the death of J. Bernard Edmonds on October 25, 1954. For many years Mr. Edmonds was widely known as a consultant in wine and fermentation industries, having secured a number of patents relating to wine pro-

cessing. For many years he served the Baltimore Chapter with distinction as Secretary-Treasurer.

Mr. Edmonds, noted chemical engineer and food chemist, died Oct. 25, 1954, at Union Memorial Hospital, Baltimore, at the age of fifty-nine. As a specialist in the design and construction of fermentation plants, he had built many prominent distilleries and wineries throughout the east, and was, at the time of his death, engaged as consultant by Baltimore's largest wine producing company. He was frequently called upon to provide expert testimony in legal cases involving food and beverage analysis. He held a number of patents relating to wine processing.

At one time chief chemical engineer at Davison Chemical Company, Mr. Edmonds entered into private practice in 1932 as an analytical and consulting chemist. He was a Fellow of the AIC, and secretary of the Baltimore Chapter. He was a member of the Institute of Food Technologists. He also contributed to scientific advances in the field of fertilizers and soil chemistry.

Born in Washington, D.C., he was graduated from Georgetown University in 1915, and received the M.A. degree from there in 1918. He had made his home in Baltimore for the past thirty-seven years. He is survived by his wife, Mrs. Mary Reinhardt Edmonds, and five daughters, Mrs. Richard B. Treash, Mrs. Donald M. Lewis, Mrs. James H. Stephens, Miss Charlotte Edmonds, and Miss Jane F. Edmonds.

Ohio Chapter

Chairman, Malvern J. Hiler
Chairman-elect, Harold M. Olson
Secretary-Treasurer, Eugene R. Ewell
 Lowe Brothers
 436 East Third St.,
 Dayton, Ohio
National Council Representative,
 Guy A. Kirton

Annual Meeting

The Ohio Chapter will hold its Annual Meeting on Friday, April 20, 1956, at the Fort Hayes Hotel, Columbus, Ohio, with the following tentative program:

9:00 a.m. to 12:00 noon: Trips to Battelle and Ohio State University.

12:30 p.m. Informal Luncheon
 2:30 p.m. Registration
 3:00 p.m. Annual Business Meeting
 3:45 p.m. Address by one of the National Officers
 6:00 p.m. Informal Reception
 7:00 p.m. Annual "Ohio Award Dinner."
 8:00 p.m. Presentation of "Ohio Award."

Washington Chapter

President, Paul E. Reichardt
Vice President, John F. Williams
Treasurer, Albert F. Parks
Secretary, T. Allan Davis
 1016 Urell Place, N.E.
 Washington 17, D.C.
National Council Representative,
 Paul E. Reichardt

Problems of a Customs Chemist

The Washington Chapter met January 10th at luncheon at O'Donnell's Sea Grill, Washington, D.C. President Reichardt extended a warm welcome to the guests, among whom were Dr. Vanderveer Voorhees, F.A.I.C., a charter member of the Chicago AIC Chapter, who is now a consultant residing in Los Altos, California.

President Reichardt introduced vice president John F. Williams, who was tendering his resignation from the U.S. Customs Service, Department of the Treasury as of January 31, 1956.

Mr. Williams spoke on the "Problems of a Customs Chemist" and covered among other subjects:

- Number and location of laboratories
- Number and type of personnel
- Training of personnel as to precision and accuracy of tests.

- Laboratory equipment.

- Responsibility of developing adequate and efficient methods of sampling and testing.

- Development and comparability tests where none exist for comparing similar and competitive imports to domestic commodities such as dyes.
- Determination of composition of alloys and mixtures and plastics as durability is frequently based on percentage of certain elements or compounds or upon the component of chief value.

- Customs Laboratory, a consultant to the Customs Officer on Tariff Class-

ification, must identify imports not only as to composition but also as to the tariff classifications.

Importance of report writing as the facts have to be clearly presented and interpreted in terms of the Tariff Act.

Correctness of tests so that the right amount of revenue is obtained.

This talk was so well received that those present hoped Mr. Williams would write it for presentation in *THE CHEMIST*.

Will You Come

Memo

To AIC Chapter Secretaries:

Please send the dates (or approximate dates) of the meetings which your Chapter plans. They will be listed in this column.

—Editor, *THE CHEMIST*

Feb. 8, 1956. National Council and Board of Directors of The American Institute of Chemists. Meeting. Akron, Ohio.

Feb. 10, 1956. New York Chapter. Joint meeting with American Chemical Society. Dinner. 6:00 p.m. Carbide & Carbon Cafeteria, 30 E. 42nd St., New York, N. Y. Panel Symposium: "High School Science Teacher Scarcity — a Nationwide Dilemma." Introduction: Dr. Hubert Alyea of Princeton University. Speaker: Samuel Schenberg, Supervisor of Science for the Board of Education of the City of New York. Panel Groups: (1) Industrial Employers who have hired science teachers for summer laboratory positions: Karl M. Herstein, President, Herstein Laboratories; Dr. C. L. Wrenshall, Director, Technical Services, Chas. Pfizer & Co., and R. V. Worthington, Industrial Relations Adviser, Technical Service Department, Socony Mobil Oil Co. (2) High School Science Teachers who were employed last summer in industrial positions: Sidney P. Harria, Herbert Tucker, William Clarvit. Moderator, Prof. Alyea.

Feb. 14, 1956. Washington Chapter. Luncheon, O'Donnell's Sea Grill, Washington, D. C. Speaker, Dr. Carl Wessel,

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assistant director, Prevention of Deterioration Center, National Research Council, "The Activities of the Deterioration Center."

Feb. 16, 1956. Western Chapter. Anheuser-Busch Ratskeller, Van Nuys, California. Dinner and tour of brewery. Motion picture on the famous Scotts-Clyde Horses. Admittance by reservation only.

Feb. 17, 1956. Chicago Chapter. Dinner, Engineers Club. Award of Honorary AIC Membership to Dr. Roy C. Newton, F.A.I.C., vice president in charge of research, Swift & Company. Speakers, Dr. Gail Dack, head, Dept. of Bacteriology, University of Chicago, "Newton — the Man"; Harold S. Mitchell, former director, Swift Laboratories, "Newton — the Scientist"; Dr. Newton, "The Effect of Agricultural Research on Industrial Growth."

March 27, 1956. New Jersey Chapter. Visit to Picatinny Arsenal.

April 1956. (Date to be announced.) New England Chapter. Dinner. Award of Honor Scroll and Student Medals.

April 6, 1956. Chicago Chapter. "Young Chemists' Meeting," honoring student winners of AIC medals. Speaker, Dr. Ray P. Dinsmore, "Let's Talk About Your First Job." For reservations, H. F. Schwartz, CO 4-8800, Ext. 475.

April 20, 1956. Ohio Chapter. Annual Meeting. Fort Hayes Hotel, Columbus, Ohio. Morning: Trip to Battelle Memorial Institute and Ohio State University. Informal luncheon. Afternoon: Annual Business Meeting. Address by one of the national AIC officers. Even-

ing: Informal Reception, Annual "Ohio Award Dinner." Presentation of the "Ohio Award."

April 26, 1956. New York Chapter. Theme: "So You're Going to be a Chemist." Student Medal Awards.

April 27, 1956. Chicago Chapter. Speaker, Dr. Lawrence S. Kubie, Psychiatrist and member of staff, Yale University College of Medicine, "Personal Problems of Scientists." For reservations: H. F. Schwartz, Co 4-8800, Ext. 475.

May 3, 1956. New Jersey Chapter. Presentation of Honor Scroll. Newark, N. J.

May 9, 1956. The AIC President's Reception to the Officers, National Councilors, Members of the Annual Meeting Committee, and their wives. Hotel Statler, Boston, Mass.

May 9, 1956. National AIC Council and Board of Directors. Dinner Meeting. Statler Hotel, Boston, Mass.

May 10-11, 1956. Annual Meeting. The American Institute of Chemists, Inc. Hotel Statler, Boston, Mass. Theme: "The Chemist Looks at Communication." Thursday a.m., Annual Business Meeting. Noon, Informal Luncheon. Afternoon, First Professional Session, "The What and Why of Communication." Ladies program. Evening: Reception for the Medalist. Dinner. Presentation of the Gold Medal to Raymond Stevens, vice president, Arthur D. Little, Inc. Toastmaster, Dr. Ray P. Dinsmore. Speaker for the Medalist, Dr. Lawrence W. Bass. Presentation, Lawrence H. Flett. Medal Acceptance Address, Mr. Stevens, "The Liberating Arts."

Friday, Council Breakfast. Coffee Hour. Second Professional Session. Subject, "Communication and the Scientific Professions." President's Luncheon: Presiding, Dr. D. B. Keyes. President's Address, Dr. R. P. Dinsmore. Afternoon, Third Professional Session, "Communication and the Individual Professional Man."

June 7, 1956. New York Chapter. Annual Dinner Meeting. Hotel Commodore, New York, N. Y. Honor Scroll Presentation.

May 15-17, 1957. Thirty-fourth Annual Meeting. The American Institute of Chemists. Sheraton-Mayflower Hotel, Akron, Ohio.

Opportunities

Doris Eager, M.A.I.C.

AIC members who are seeking positions may place notices in this column without charge.

Chemists Available

Analytical Chemist, F.A.I.C., with experience in supervision of control department of ethical drug manufacturer, seeks a position which offers the possibility of advancement. Publications and membership in societies. Box 20, THE CHEMIST.

Chemist, F.A.I.C., B.S. 1940. Research & development, plasticizers and polymers, metal surface coatings, (inorganic); rare and semi-rare metals. Supervisory in metal finishing and laboratory. Lithium, tungsten, titanium zirconium salts, in laboratory and plant. Box 22, THE CHEMIST.

Literature chemist, experienced library supervisor in foods, petroleum, and editor of well-known bulletin of abstracts on petroleum research, desires responsible position, preferably technical writer, editor, abstractor, public relations. Box 24, THE CHEMIST.

Research and Development Direction. Ph.D., 17 years in industrial organic, biophysics and chemical engineering. Foods, pharmaceuticals, and sanitary chemicals. Patents and publications. Age 37. Box 26, THE CHEMIST.

Positions Available

Purchasing Engineer: Good basic knowledge of purchasing, familiar with plastic and rubber compounds and mold design. Undergraduate degree in either Chemical or Mechanical Engineering required. Age 40-45 preferred. Salary open, liberal program of fringe benefits. Location Midwest. Box 231, THE CHEMIST.

OPPORTUNITIES

Man to operate 2-4 D plant, along with other agricultural chemicals. Oregon. Salary commensurate with experience. Box 233, THE CHEMIST.

Ph.D. Chemistry. Age 30-35. Experience — Cereal Chemistry, fermentation processes and by-products, with specialization in a field such as nutrition (human and animal), pharmaceuticals or microbiology. Salary \$12-15,000. Location mid-west. Box 21, THE CHEMIST.

Washington Representative to take charge of contracts and maintain a working relationship with governmental agencies. Age 35-45. Chemical background and experience in government contract negotiations necessary. Salary in \$15,000 range. Box 23, THE CHEMIST.

Engineers, Physicists, Sales Engineers: B.S., M.S. or Ph.D. in EE or ME. Experienced, or trained, in nuclear physics, radiochemical research, electronics, radar and related fields. New England. Box 25, THE CHEMIST.

Chemist for pharmaceutical development and research with Midwest manufacturing Company, preferably with experience. Box 29, THE CHEMIST.

For Your Library

The Lipids

Their Chemistry and Biochemistry. Vol. II. By Harry J. Deuel, Jr., Interscience Publishers, Inc. 1955. 919 pp. 9-1/2" x 6-1/2". \$25.00.

This volume covers much valuable information on the digestion, absorption, transport, and storage of fats and other lipids in the animal body. Also included are topics of strictly chemical nature, the action of the several enzymes on fats and lipids, and a discussion on changes to be found in health and disease. A series of tables and graphs summarize data collected from the literature. The text is supplemented by a well-selected bibliography. There is an author index and a subject index. This is a very excellent reference book on lipids. It has the reviewer's highest recommendation.

—Dr. Henry Tauber, F.A.I.C.

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Advances in Catalysis

And Related Subjects. Vol. VI. Editors: W. G. Frankenburg, V. I. Komarewsky, and E. K. Rideal, 1954. Academic Press, Inc. 467 pp. 6" x 9". \$10.50.

This volume continues the admirable series of *Advances in Catalysis*. Catalysis is an agglomeration of a myriad of experimental facts, procedures, and inferences. The subjects covered are "Catalysis at Liquid Interfaces" by J. T. Davies; "Chemisorption" by Takao Kwan; "Colloidal Metals" by William P. Dunworth and F. F. Nord; "Acid and Base Catalysis" by Martin Kilpatrick; "Measurements in Catalysis" by P. B. Weisz and C. D. Prater; "Petroleum Isomerization" by B. L. Evering, and "Petroleum Cracking" by Rodney V. Shankland. This book is well worth having.

—Dr. John A. Steffens, F.A.I.C.

Chemical Books Abroad

Rudolph Seiden, F.A.I.C.

Georg Thieme Verlag, Stuttgart: *Methoden der organischen Chemie*, by E. Mueller; *Vol. IX: Schwefel-, Selen-, Tellur-Verbindungen* (1,368 pp.; DM 218.-) is the 6th part of the completely revised 4th edition of Houben-Weyl's standard work on the methods of organic chemistry (see THE CHEMIST, August and December, 1955, issues). The latest volume deals with organic S compounds which are so important as dyestuffs, pharmaceuticals, rodenticides, insecticides, herbicides, cleansers; for the textile, rubber, and plastic industries; to biochemistry, etc.; organic Se and Te compounds are dealt with for the first time in this work, and it is surprising to find that there are already hundreds of them in existence.

Among the 41 chapters of the book, which was prepared by 13 German experts, the following are to be mentioned as being indicative of the wide scope of this unsurpassed and up-to-date work: mercaptans and thiophenols; polysulfides, ethylene sulfides; sulfonium compounds; sulfones and sulfoximines; sulfenic acids, sulfinic acids, sulfonic acids, and their derivatives; sulfonyl halides; thiosulfonic acid esters; thioaldehydes and thioketones; selenoles; telluroles; ditellurides; polyselenides and S-Se-Te-containing compounds; selenic acids and derivatives; Se- and Te-containing carbonyl compounds. The author index of 58 (3-column) pp. and the subject index of 63 pp. facilitate the use of the book.

Vulkan-Verlag Dr. W. Classen, Essen: *Wörterbuch der Kokertechnik*; 1955, 357 pp.; DM 26.—An illustrated German-English and English-German dictionary of the coking technology for the engineer, chemist, and businessman. With conversion tables, abbreviations, and an appendix of everyday expressions. Printing and binding are excellent.

Hadert-Lexicon Verlag, Berlin W 30: *Die Gelatinekapsel-Herstellung*, by H. Hadert; 1954, 45 pp., (5 ill.); paper-bound DM 4.50.—The manufacture of capsules from gelatin, celluloid, acetyl cellulose, and viscose is briefly explained.

World Health Organization (Distributor: Columbia University Press, New York): *Pharmacopoea Internationalis, Vol. II*, 1955, 370 pp.; \$6.75—As with Vol. I (see *THE CHEMIST*, March, 1952), many experts of the W.H.O., International Union of Chemistry, International Organization for Standardization, International Pharmaceutical Federation, and of the World Medical Association have collaborated for years on the completion of the 2nd volume of the International Pharmacopoeia which contains 217 monographs on the various forms of insulin, antibiotics, tubocurarine chloride, and numerous modern synthetic chemicals, drugs and biologicals, as well as monographs on sterile solutions, tablets, and tinctures, and 26 appendices concerning assays and laboratory methods. This publication should contribute to closer cooperation of the scientists of the world and to the development of international commerce.

Communications

Approves Affiliates

To the Editor:

I want to lend my support to the proposal that has been presented by Dr. L. F. Pierce in his communication to the editor in the recent issue of *THE CHEMIST* (December, 1955).

The good that can be accomplished will far outweigh any harm that might develop.

—Romeo P. Allard, F.A.I.C.
Los Angeles, Calif.

On Public Relations

To the Editor:

Some time ago I read an editorial on public relations. It stated that the practice of setting up an office to adjust claims against a company during or immediately after a disaster, such as those at Texas City or Whiting, Indiana, is a good public relations practice.

To a lawyer, settlement of claims in haste is a bad practice for the injured party, but good business for the company. Such settlements of a cause of action without advice of counsel and with the signing of a General Release may indeed lead to bad public relations.

Public relations consists of recognizing the duty owing to the public. In the case of a corporation, chemical or otherwise, it consists of first recalling why and how such a duty arises.

A corporation receives a birth certificate, indeed its very life blood, practically as a gift from the public. No corporation has a constitutional right of existence. It is a legislative right granted by the various States and free countries. There are no corporations in Russia.

The birth certificate, using the language of the lawyer, is sometimes called a corporate franchise or Articles of Incorporation. Here in New York, the minimum out of pocket cost to form a corporation is \$50.00. For this a corporation is born which has perpetual life. As long as there is a United States there will be a General Motors. But more than this, the corporation is a being in itself. And the most that the founders of a corporation can lose is that which they put into it, whereas the most that they can win are "riches beyond the greed of avarice"

(with apologies to Samuel Johnson).

While a corporation has perpetual life and in law is a being, albeit not a human being, it has but one aim in life, i.e. to make money or a profit. How many buyers of chemical common stock do you think know the facts of chemistry? A corporation is the closest thing to a human being, legally speaking. Thus a corporation can hire and fire people. Also a corporation can buy and sell property, etc.

In recent times, industrial democracies behave as if they consist of capital and labor, i.e. corporations and unions. Actually there is a great mass of public indifferent to both capital and labor. It is said that there are but about 25,000 substantial investors in corporations, that is disregarding the small share holders, called Mary Janes by *Life Magazine*. Also while there are several million union members, their number is but about ten per cent of the overall population of about 170 million. Clearly, capital and labor, being in the minority, both owe a duty to the public which legally suffers both to exist. Neither has a soul, nor a god-given right, nor even a constitutional right, to existence. There is nothing to prevent the individual states from abolishing the granting of corporate birth certificates should the legislative bodies thereof deem it best to so do.

Accordingly all corporations owe a duty to the public and are really public service corporations, and the so-called Public Service Corporations are really Quasi-Government Corporations. The old concept of a private corporation with a "I'll do as I please" attitude is passing.

A corporation's duty to its originators, the public first and the investors next, is now being recognized. Public relations, therefore, consists in giving to the public what is justly in duty owed to the public.

In summary, good relations between corporations and the public in part rests in:

(1) The corporations realizing that the corporate franchise is a privilege granted by the public and that corporations do not have a god-given right to existence;

(2) That this right to a corporation franchise is a grant made by enactment of state legislative laws to this effect, and that the states may revoke and abolish corporations as a way of business life;

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(3) That corporations are legal beings created by man, but they have no religion or soul, whereas man is a being created by God.

—Dr. Frank Makara, F.A.I.C.
New York, N. Y.

What They Should Read

To the Editor:

I certainly should like to put a copy of the December issue of *THE CHEMIST* in the hands of every science student in this school. This is what they should be reading!

—Elmer A. Finch
Amityville, N. Y.

Consolidated: The research activities of American Cyanamid Company into a single division under the direction of Kenneth H. Klipstein, F.A.I.C. New research facilities are planned for the Bound Brook, N.J., and Pearl River, N.Y., laboratories.

Installed: As director of the Salesmen's Association of the American Chemical Industry, Inc., 535 Fifth Ave., New York 17, N. Y., Lester E. Johnston, F.A.I.C., of International Nickel Company.

Appointed: Dana T. Hughes as director of public relations of Alco Products, Inc., Schenectady, N.Y.

Retired: Dr. Joseph W. E. Harrison, F.A.I.C., after twenty-six years as a member of the faculty of the Philadelphia College of Pharmacy & Science, Philadelphia, Pa. He has been named emeritus director of the Department of Pharmacology and emeritus professor of pharmacology. He continues to direct the research laboratories of LaWall & Harrison of Philadelphia.

Promoted: Dr. Fred Fordemwalt, F.A.I.C., to assistant to the director of the laboratories of American Cyanamid Company's Research Division at Bound Brook, N. J. He joined Cyanamid in 1940 as chemist in the Physical Chemistry Research Division. He later became assistant chief chemist, sectional director in the Application Research Department, and most recently assistant manager of the Dyes Research Department.

Appointed: Dr. Thomas W. Davis, F.A.I.C., as chairman of the Department of Chemistry at University College of Arts and Science of New York University. Prof. Davis, a member of the faculty since 1929, succeeds Prof. Harry G. Lindwall, F.A.I.C., who asked to be relieved of his duties as chairman after eighteen years in the position. Prof. Lindwall will continue to teach at the College.

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Appointed: Dr. W. A. Raimond, F.A.I.C., as assistant technical director of the Organic Chemicals Division of American Cyanamid Company. He was formerly technical director for dyes and related products in the Technical Department of the Division.

New position: For Dr. James R. Dudley, F.A.I.C., who is now director of research and development of The Richardson Company, Melrose Park, Ill. He was formerly vice president of The Carwin Company, North Haven, Conn.

Promoted: Rudolph Seiden, F.A.I.C., to the position of vice president in charge of production and research of Haver-Glover Laboratories, a subsidiary of Cutter Laboratories, Kansas City, Missouri. He has been chief chemist of Haver-Glover from 1938 until its merger with Cutter on December 28, 1955.

Appointed: By Nopco Chemical Co., Harrison, N. J., Edward G. Ackerman as advertising manager.

"Absurd": Declared Dr. John C. Warner, Hon. AIC, "to trust the administration of a modern state to men ignorant of science and its consequences to society." He was speaking at Bucknell University on September 28th, at the dedication of the new F. W. Olin Science Building. "Neither should we trust the administration of a governmental unit or a business to a scientist or engineer who is ignorant of the humanities." He concluded, that "we need to educate political, moral, and business leaders who are more scientific and scientific leaders who are more humane."

Something New

"Acoustica Model DR-400 Ultrasonic Vibrator." Bulletin DR-400. Acoustica Associates, Inc., Shore Rd., Glenwood Landing, L. I., N. Y.

"Witco DGO, diethylene glycol oleate" and "Witco GMO, glycerol mono oleate." Tech. Service Bulletins H-3 and H-4. Request on letterhead. Witco Chemical Co., 122 E. 42nd St., New York 17, N. Y.

"Acrawax C Powdered Synthetic Wax." Information and samples. Glyco Products Co., Inc., Empire State Bldg., New York 1, N. Y.

"New series of corrosion resistant precipitation hardenable stainless steel alloys." Information. Cooper Alloy Corp., Hillside, N. J.

"Infrared Absorption Spectroscopy." Service information. Electrical Testing Labs., Inc., 2 East End Ave., 79th St., New York 21, N. Y.

"Polyurethane foam." Information. American Collo Corp., 525 Oritan Ave., Ridgefield, N. J.

"Annual Index of Chemical Market Abstracts." Information. Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y.



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Bulletin "What's New in Food and Drug Research"
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"Deposition of Salts from Sea Water by Frigid Concentration." Research Report PB111606. 34 pp. \$1.00 from OTS, U. S. Dep't of Commerce, Washington 25, D. C.

"Proceedings of the 2nd Louisiana Structural Engineering Conference." Bulletin No. 49. \$1.00. Eng. Exp. Sta., Louisiana State University, Baton Rouge, La.

"Colloids Out of the Sea." 8 pp. brochure. Request from Byron Spence, Seaplast Chemical Corp., 63 David St., New Bedford, Mass.

"Precision Finishing Techniques for Magnetic Alloys, 8 pp. bulletin. Stanat Mfg. Co., Inc., 47-28 37th St., Long Island City 1, N. Y.

"Calcium Carbonate AR Primary Standard." Information. Mallinckrodt Chemical Works, St. Louis 7, Missouri.

"Introduction to The National Registry of Rare Chemicals." Folder. Public Information Service, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

"Forced-Draft 'Thermo - Circulator' Ovens." Bulletin 3505M. Labline, Inc., 3070-82 W. Grand Ave., Chicago 22, Ill.

"Leak Detector." Bulletin 416. Beckman Div., Beckman Instruments, Inc., Fullerton 1, Calif.

"New radioisotope reagents." Catalog. General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

"Impervite Cubical Heat Exchanger." Information. Write John Reys, Chief Engineer, Falls Industries, Inc., 31905 Aurora Rd., Solon, Ohio.

RARE CHEMICALS

Tetranitromethane

Inorganic Nitrides

Organic Nitrates

O. JOHNSON & E. SCUDDER**92 ORCHARD STREET****Bloomfield, N. J.**

"Review of the Air Force Materials Research & Development Program." Report PB 111648. 105 pp. \$2.75. OTS, U. S. Dep't of Commerce, Washington 25, D. C.

"Pfizer Vegetable Color and Pfizer Beta Carotene." Coloring agents. Information. Chemical Sales Div., Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.

"New Model Polyethylene Sink Trap." Information. Arthur S. LaPine & Co., 6001 South Knox Ave., Chicago 29, Ill.

"Ultramicrobalance for laboratory analysis and research work." Information. Microtech Services Co., Box 121, Berkeley, Calif.

"Conax Check Well with dial type thermometer." Information. Conax Corp., 7811 Sheridan Dr., Buffalo 21, N. Y.

"Radioactive Tracers: C-14 tagged steroids." Information. Sales Dept., Tracerlab, Inc., High St., Boston, Mass.

"Small size Deaerating Heater." Bulletin. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.

"Leather Research & Technology at the National Bureau of Standards." Circular 560. 15-cents. Order from Government Printing Office, Washington 25, D. C.

"New Liquid Chlorinated Paraffin with 50% Chlorine Content." Data. Diamond Alkali Co., Chlorinated Products Div., 300 Union Commerce Bldg., Cleveland 14, Ohio.

"HYCRYL A-1000, water solution of modified polyacrylate." Information. Union Bay State Chemical Co., Inc., 491 Main St., Cambridge, Mass.

"The Hazards of Vaporizing Liquid Extinguishing Agents." NFPA No. 182-M. 8 pp. 25-cents. National Fire Protection Ass'n., 60 Batterymarch St., Boston 10, Mass.

"Gardner Automatic Photometric Unit & Precision Exposure Heads." Bulletin No. 161, Gardner Lab., Inc., 4723 Elm St., Bethesda 14, Md.

"Glycowax S 932, to prevent oxidation of solder." Samples and bulletin. Glyco Products Co., Inc., Empire State Bldg., New York 1, N. Y.

"Characterization of C21-C30 Hydrocarbons and Their Mixtures." PB 111646. 104 pp. \$2.75. OTS, U. S. Dep't of Commerce, Washington 25, D. C.

Condensates**Ed. F. Degering, F.A.I.C.**

In the basic sciences our most pressing needs are for those scientists who have the imagination and trained creative power to make the discoveries and generate new concepts which advance science.

—Dr. James R. Killian, Jr.

I never pay much attention to criticism after I have drawn what wisdom I can from it.

—Norman Vincent Peale

It is one of the sad truths of life that experience is not transmissible. No man will learn from the suffering of another, but must suffer for himself.

—Lions Newsletter

Vinyl film is now being used extensively in Japan to provide "greenhouses by the mile" for rows of tender crops.

It may be that atomic power and solar energy might combine to usher in a near millennium in which all get more for less.

The spark which touched off our technological explosion, according to Granville M. Read of Du Pont Company, was the American concept of freedom.

In 1855 the entire wealth of this nation was estimated at less than twelve-billion dollars, whereas one-hundred years later about four times this amount will be spent for new construction and producers' equipment.



"Wonder-worker" for the wonder drugs

*How
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assures purity,
speeds production*

When producers of antibiotics sought a filter aid that would assure removal of all mycelium and other gelatinous impurities in the broth from which wonder drugs are extracted—and speed their "put-through" in the bargain—Celite ended the search.

The effectiveness of Celite can be attributed to these important factors which make it unique among filter aids:

Carefully processed from the purest deposit of diatomaceous silica known, Celite is available in nine standard grades—each designed to trap out suspended impurities of a given size and type. Whenever you reorder, you are assured of the same uniform, accurately graded powder re-

ceived in your initial order. Thus, with Celite, you can count on consistent purity in your filtrates—at highest rate of flow—month after month, year after year.

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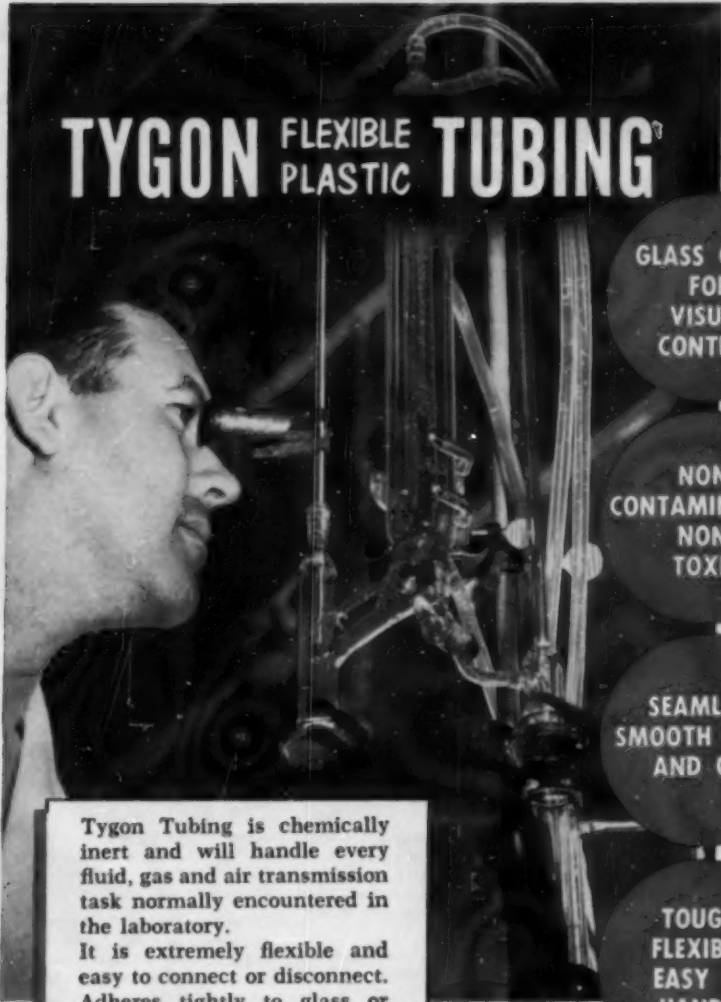
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